1991

ORNL
MASTER COPY

UCN-2383
(3 11-60)

OAK RIDGE NATIONAL LABORATORY
Operated by
UNION CARBIDE NUCLEAR COMPANY
Division of Union Carbide Corporation
UCC
Post Office Box X
Oak Ridge, Tennessee

For Internal Use Only

ORNL-Dc
CENTRAL FILES NUMBER
63-1-23

COPY NO. 38

DATE: January 11, 1963

SUBJECT: LABORATORY FACILITIES - WASTE DISPOSAL
Report for November 1962

TO: Distribution

FROM: J. F. Manneschmidt

Inventory of Total Activity Discharged

A summary of the total liquid and gaseous radioactivity released to the environment during the month of November by the Laboratory waste disposal system is given in Table 1. Released quantities of the three nuclides of greatest significance - strontium, Ru^{106}, and Cs^{137} - are also included. Discharge data was compiled from routine samples taken at the process waste monitoring stations and diversion box; the Waste Treatment Plant - Settling Basin discharge; White Oak Creek and Melton Branch; the seepage streams in the soil disposal area; and the three major process stacks. Locations of the various sampling points are shown in Figure 1. The radioactivity contributed by the source titled "Burial Ground No. 4 and Miscellaneous Laboratory Drainage to White Oak Creek" is arrived at by difference between the activity measured in the Settling Basin discharge (process waste) and that found in White Oak Creek, just north of its confluence with Melton Branch. Data on the White Oak Dam discharge were obtained from the Environmental Monitoring group of the Health Physics Division.

Process WasteTreatment and Discharge to White Oak Creek

Operating conditions were normal in the process waste system and essentially unchanged from recent months. About 15 million gallons of waste were treated and approximately 0.3 curies of activity were released to White Oak Creek. Strontium accounted for two thirds of this. The overall decontamination factor at the treatment plant was only slightly changed; however, strontium removal was improved. Process waste volumes are shown in Figure 2; operational data for the waste treatment plant is given in Table 2.

TABLE 1

SUMMARY OF TOTAL LIQUID AND GASEOUS ACTIVITY DISCHARGED

SOURCE	MONITORING STATION NUMBER[1]	ACTIVITY (Curies)			
		Total Sr	Ru^{106}	Cs^{137}	TOTAL[2]
Liquid Waste					
Process Waste to White Oak Creek	1	0.2	<0.1	0.1	0.3 - 0.4
Burial Ground No. 4 and Miscellaneous Laboratory Drainage to White Oak Creek[4]	1,2	0.6	0	0	0.6
7500 Waste to Melton Branch	3	0.03	<0.02	<0.04	0.03-0.09
East Waste Pit Seepage to White Oak Creek	4	0.001	102.	0	104.
West Waste Pit Seepage to White Oak Creek	5	0.001	88.	0	90.
Total Liquid Waste Discharged to White Oak Lake		0.8	190.	0.1	195.
White Oak Dam to Clinch River	6	1.5	115.	0.4	122.
Gaseous Waste[3]					
3039 Stack	7				3.63
3020 Stack	8				0.17
3018 Stack	9				0.05
7500 Stack	10				
Total Gaseous Waste Discharged to Environment					3.85

[1] Refers to Fig. 1.

[2] Includes other nuclides not listed here.

[3] Activity primarily I^{131} as noted in text.

[4] Activity from these sources gotten by difference between the activities measured at Stations 1 and 2.

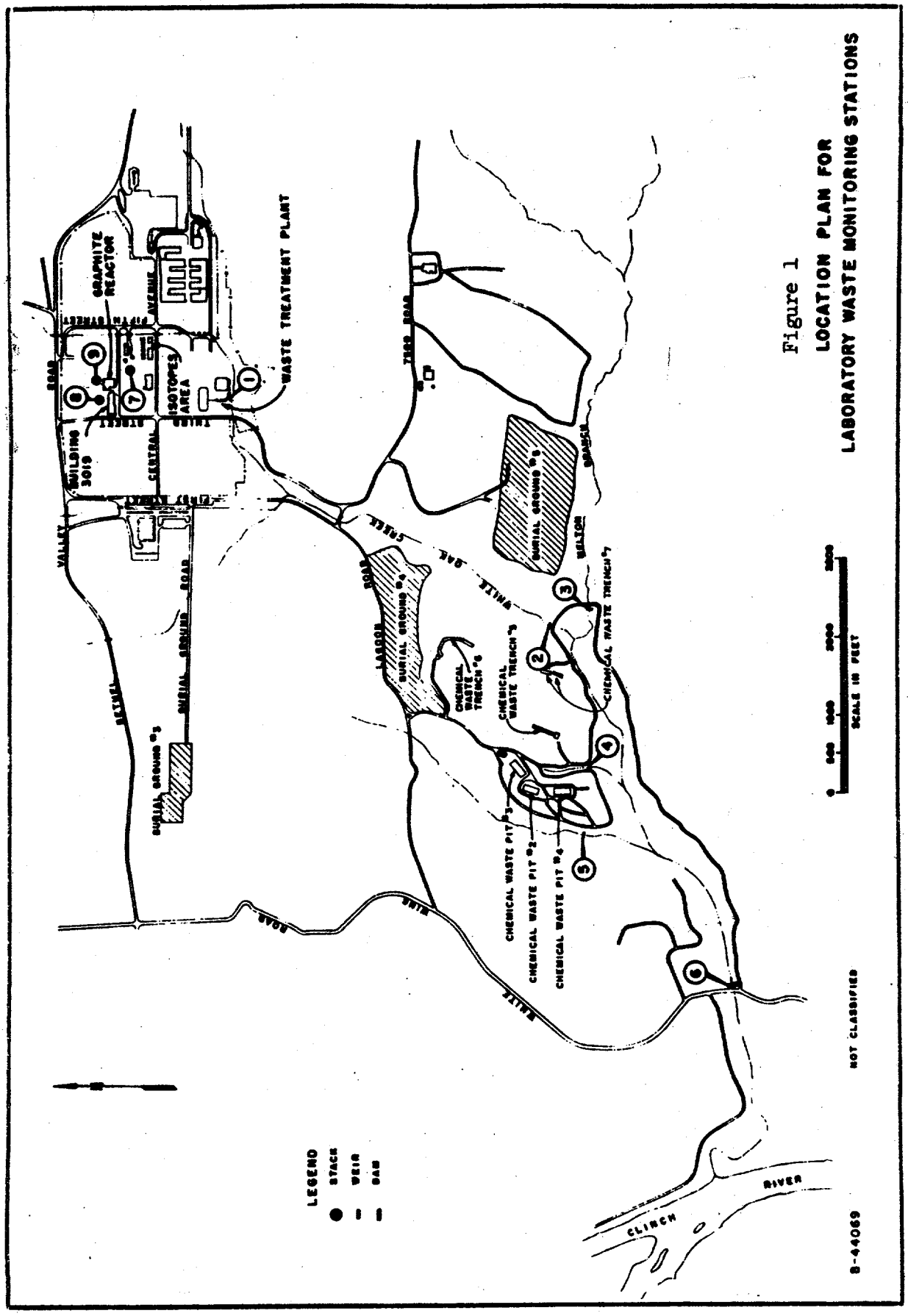

Figure 1
LOCATION PLAN FOR
LABORATORY WASTE MONITORING STATIONS

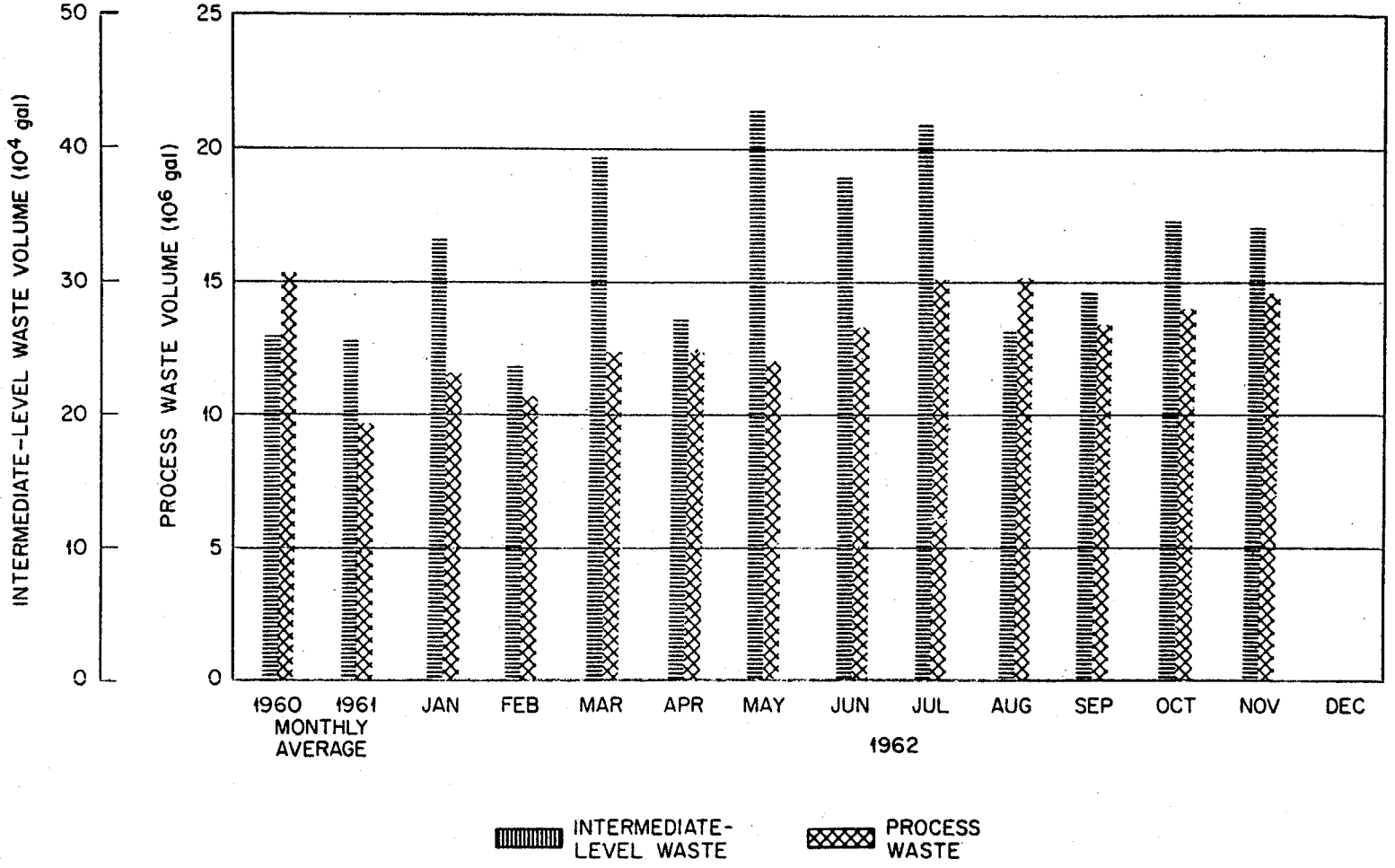

Fig. 2. Liquid Waste Volumes.

TABLE 2

PROCESS WASTE TREATMENT AND DISCHARGE TO WHITE OAK CREEK

WASTE VOLUME TREATED THIS MONTH: 14.7×10^6 gals

TOTAL WASTE VOLUME DISCHARGED TO WHITE OAK CREEK THIS MONTH: 15.3×10^6 gals

NUCLIDES	PLANT INFLUENT (Curies)	PLANT EFFLUENT TO SETTLING BASIN (Curies)	SETTLING BASIN DISCHARGE TO WHITE OAK CREEK (Curies)	PERCENT REMOVED BY TREATMENT PLANT AND SETTLING BASIN
Total Sr[1]	1.1	0.3	0.2	82
$Ru^{103,106}$	< 0.1	< 0.1	< 0.1	--
Co^{60}	0	0	0	--
Cs^{137}	0.7	0.1	0.1	86
TRE	0	0	0	--
Total	1.8	0.4	0.3	83

[1]Past analyses indicate that "Total Sr" is greater than 90% Sr^{90}

Table 3 lists the principal contributors to the process waste system and gives the volume of waste and the amount of Sr^{90} activity discharged by each.

Intermediate Level Waste

November transfers of intermediate-level waste to the soil disposal area totalled 340 thousand gallons (See Figure 2).

Distribution was made to the pits and trenches, as follows:

1.	Pit No. 2	78,600 gallons
2.	Trench No. 5	160,200 gallons
3.	Trench No. 7-A	50,400 gallons
4.	Trench No. 7-B	51,600 gallons

The operation of trench No. 7 has been continued at a rate far below its capacity. Small amounts of radioactivity have been detected in two monitoring wells located on the east side of the north (A) section of Trench No. 7. Although the level of the activity, which was predominantly ruthenium, was almost insignificant, continuing surveillance of the wells will be maintained.

Pit No. 2 was taken out of service late in the month and back-fill operations started. Pit No. 4 will continue to be used for the disposal of sludge from the WasteTreatment Plant and as a stand-by facility.

Major contributors to the ILW system were as follows:

1.	Reactor Operations	75,000 gallons
2.	Building 3019	63,300 gallons
3.	Radioisotopes Processing Area	34,500 gallons
4.	Fission Products Development Laboratory	30,900 gallons
5.	4500 Area	24,400 gallons

TABLE 3

PROCESS WASTE DISCHARGES

SOURCE	GROSS BETA ACTIVITY AVERAGE, μc/m/ml	Sr^{90}		VOLUME	
		MILLICURIES	% OF TOTAL	GAL x 10^6	% OF TOTAL
1. Reactor Operations and Decontamination Facility	35	384	72	2.3	17
2. Buildings 3503 and 3508	13	102	19	1.0	8
3. Radioisotopes Processing Area	18	47	9	0.5	4
4. 4500 Area	0	0	0	7.3	55
5. Buildings 3025, 3026 and HRLEL	0	0	0	1.6	12
6. Fission Products Development Laboratory	0	0	0	0.4	3
7. Building 3019	0	0	0	0.3	2

6. Building 3505 (Canal) 9,600 gallons

Complete transfer data on the intermediate-level waste system is given in Table 4.

Creek Monitoring

November saw a sharp reduction in the total activity release to White Oak Creek. Following the downward trend established during the year, only 195 curies were measured in the stream system. This is less than half the discharge reported in October (See Figure 3). The strontium release (0.8 curies) increased slightly and, as in recent months, the greater part of this came from the leakage of contamination into the Laboratory storm sewer system. It is hoped that the situation may be corrected within the next month.

Gaseous Waste

A total release of 3.9 curies was measured from the Laboratory gaseous waste system. Since October, the total discharge was reduced by a factor of two and the filterable discharge by a factor of seven (See Figure 4). In other respects operation of the system was normal and unchanged. Two iodine runs were made during the month, processing approximately 800 curies of I^{131}. This is more than was processed in October when the measured release was much higher and certainly seems to indicate that revisions made to the off-gas system at the iodine facility have lessened the releases from that area.

TABLE 4

ACTIVITY TRANSFERRED TO PITS AND TRENCHES

NUCLIDE	PITS 2, 3, AND 4[1], curies				TRENCH NO. 5, curies				TRENCH NO. 7-A, curies				TRENCH NO. 7-B, curies			
	This Month	Year to Date	Year 1961	Total to Date	This Month	Year to Date	Year 1961	Total to Date	This Month	Year to Date	Year	Total to Date	This Month	Year to Date	Year	Total to Date
TOTAL Sr	12	1,513	1,657		40	1,324	1,226	2,956	3	23	-	23	3	22	-	22
Ru^{106}	192	741	757		65	806	830	3,217	73	116	-	116	75	117	-	117
Cs^{137}	491	17,561	12,889		753	14,059	13,121	28,459	140	985	-	985	401	1,275	-	1,275
Co^{60}	2	111	-		4	138	-	-	< 1	2	-	2	1	3	-	3
TRE	16	1,141	855		61	608	956	2,242	6	6	-	6	5	5	-	5
TOTALS[2]	716	21,070	16,148	522,505	923	16,935	16,193	36,664	222	1,132	-	1,132	485	1,422	-	1,422

[1] Pits 3 and 4 are out of service at this time. [2] Includes other nuclides not listed here.

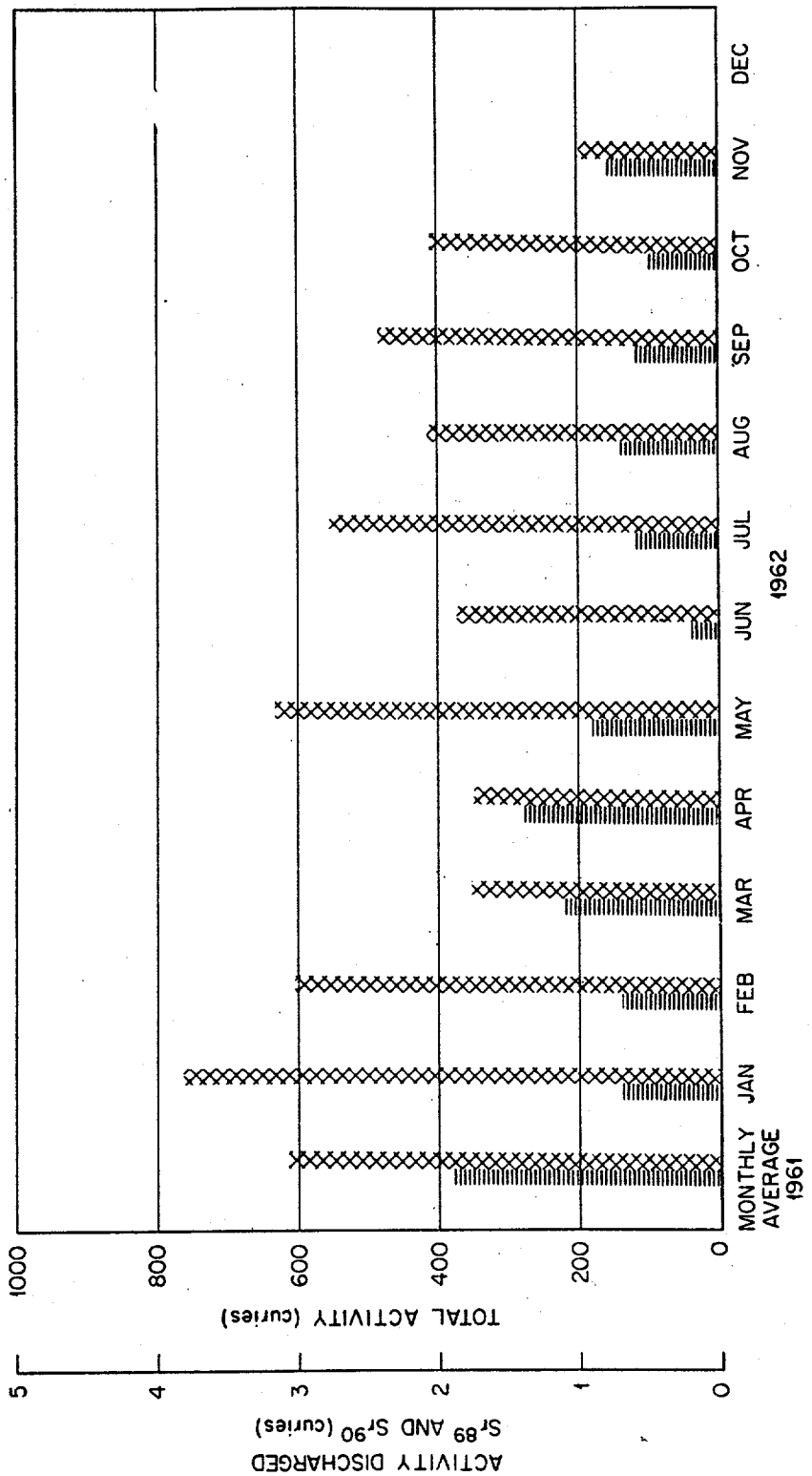

Fig. 3. Liquid Activity Discharge to White Oak Creek.

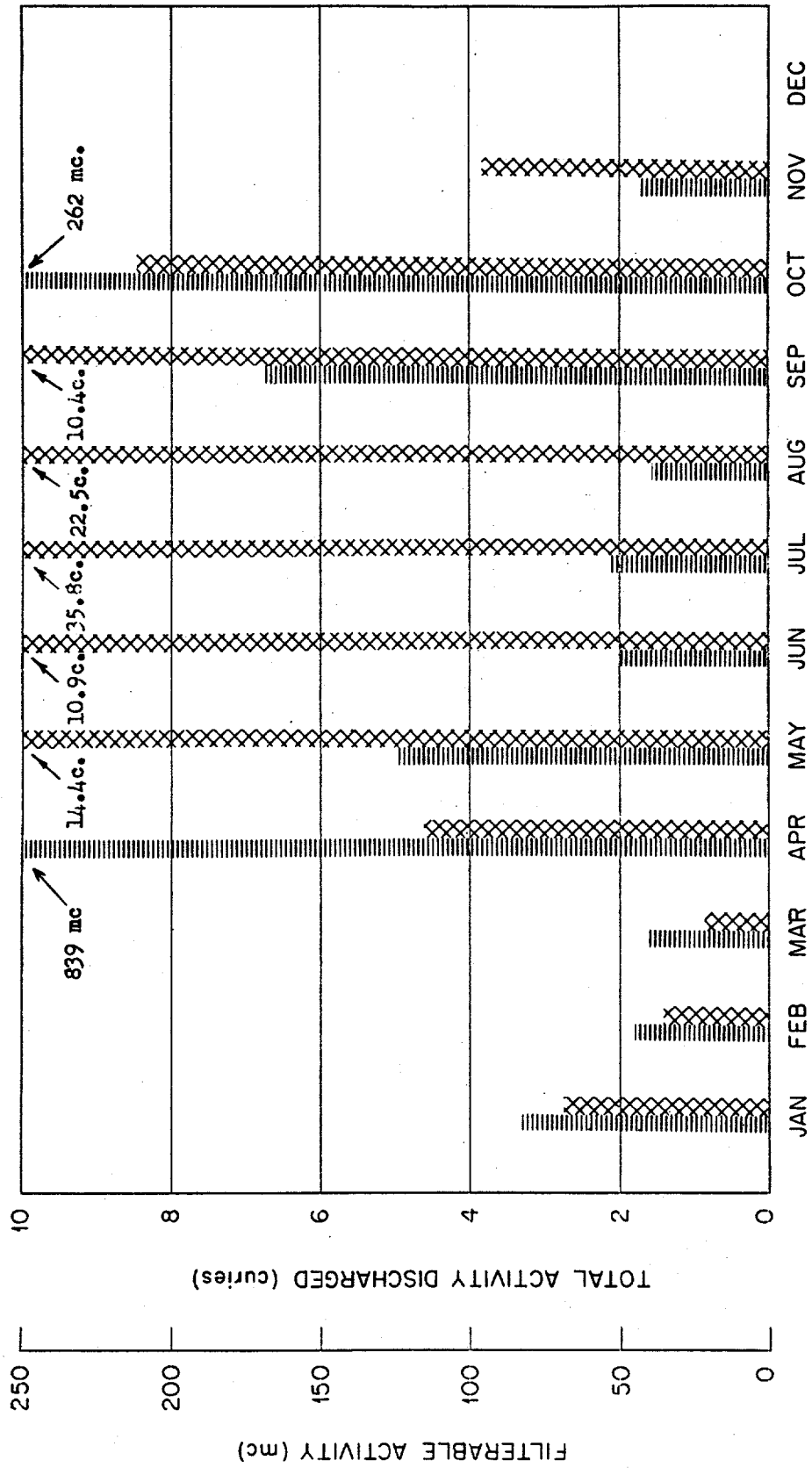

Fig. 4. Gaseous Activity Discharge to Environment.

Distribution

1. H. H. Abee
2. T. A. Arehart
3. W. A. Arnold
4. Walter Belter, AEC-DRD, Washington, D.C.
5. F. N. Browder
6. K. B. Brown
7. F. R. Bruce
8. G. C. Cain
9. K. E. Cowser
10. J. A. Cox
11. D. M. Davis
12. Wallace de Laguna
13. J. H. Gillette
14. E. D. Gupton
15. Howard V. Heacker, AEC-RDD-ORO
16. J. M. Holmes
17. D. G. Jacobs
18. F. Kertesz
19. D. J. Knowles
20. L. C. Lasher
21. T. F. Lomenick
22. R. N. Lyon
23. F. L. Parker
24. M. E. Ramsey
25. S. J. Rimshaw
26. A. F. Rupp
27. E. Schonfeld
28. M. J. Skinner
29. W. S. Snyder
30. E. G. Struxness
31. E. J. Witkowski
32. J. F. Manneschmidt
33. Document Reference Section
34-35. Central Research Library
36-37. Laboratory Records
38. Laboratory Records - ORNL-RC